

**T08D02 – (8.3) Strong and Weak Acids and Bases Notes**

Name .....

1. 8.3.1 Distinguish between strong and weak acids and bases in terms of the extent of dissociation, reaction with water and electrical conductivity. (2)
2. 8.3.2 State whether a given acid or base is strong or weak. (1)
  - a. Students should consider hydrochloric acid, nitric acid and sulfuric acid as examples of strong acids, and carboxylic acids and carbonic acid (aqueous carbon dioxide) as weak acids.
  - b. Students should consider all group 1 hydroxides and barium hydroxide as strong bases, and ammonia and amines as weak bases.
3. 8.3.3 Distinguish between strong and weak acids and bases, and determine the relative strengths of acids and bases, using experimental data. (2)

- a. Complete the following table with a list of common strong and weak acids and bases needed for IB:

Strong Acids	Weak Acids	Strong Bases	Weak Bases

- b. When a **strong acid** dissolves, show what happens with equations and a simple bar diagram:
  - c. Why is an equilibrium symbol used for weak acids and bases while a yields symbol is used for strong ones?
  - d. Give the general equations for the **strong acids** of hydrochloric, nitric, sulfuric, and perchloric acid in aqueous solutions with water:
  - e. When a **weak acid** dissolves, show what happens with equations and a simple bar diagram:
  - f. Give the general equations for the **weak acids** of ethanoic, carbonic, and phosphoric acid in aqueous solutions with water:
    - i. Stream water has a naturally acidic pH around 5.7, explain why the presence of carbon dioxide in the air causes this:
    - ii. Why does carbonic acid not actually exist?

- g. List five methods to approach distinguishing between a strong and weak acid experimentally

To experimentally determine difference in strong and weak acids	

- h. Does an acid lose its strength when it's diluted in solution?

- i. For equimolar (same concentration) solutions of hydrochloric and ethanoic acid, complete the following table with comparable properties for the strong and weak acid respectively:

	0.1 mol dm <sup>-3</sup> HCl (aq)	0.1 mol dm <sup>-3</sup> CH <sub>3</sub> COOH (aq)
[H <sup>+</sup> (aq)]		
pH		
Conductivity		
Reaction rate with Mg		
Reaction rate with CaCO <sub>3</sub>		

- j. Explain how the effect of strong and weak bases are similar and yet different to that of like bases when dissolved in solution by providing the proper generic equations and explanations:

- k. Give the general equations for the **strong bases** of sodium hydroxide, potassium hydroxide, and barium hydroxide in aqueous solutions with water:

- l. Give the general equations for the **weak bases** of ammonia and ethylamine in aqueous solutions with water:

- m. Calcium hydroxide is considered a strong base, provide an equation for the addition of Ca(OH)<sub>2</sub>(s) to aqueous solution and explain the limitations of effectiveness of this compound: